THE UNIVERSITY OF MINNESOTA

BULLETIN

Vol. 3. JULY 1, 1900. No. 10

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MINNEAPOLIS, MINN.

The University Bulletins are published by authority of the Board of Regents, six times a year,—every six weeks during the University year. Bulletins will be sent gratuitously, postage paid, to all persons who apply for them. In calling for bulletins, please state department of the University concerning which you desire information. Address

THE REGISTRAR,
The University of Minnesota,
Minneapolis, Minn.

The University

THE UNIVERSITY OF MINNESOTA comprises the following named colleges, schools and departments:

THE GRADUATE DEPARTMENT.

THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.

The School of Technical and Applied Chemistry.

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS.

THE SCHOOL OF MINES.

THE COLLEGE OF AGRICULTURE.

The School of Agriculture.

The Dairy School.

THE COLLEGE OF LAW.

THE DEPARTMENT OF MEDICINE, composed of colleges as follows:

The College of Medicine and Surgery.

The College of Homeopathic Medicine and Surgery.

The College of Dentistry.

The College of Pharmacy.

The Regents of the University have also entrusted to their charge

THE EXPERIMENT STATION;

THE GEOLOGICAL AND NATURAL HISTORY SURVEY.

THE GRADUATE DEPARTMENT. In each of the colleges, except that of medicine, there are advanced courses of study leading to second degrees. These courses are open to graduates of any reputable college upon presentation of diploma.

In the COLLEGE OF SCIENCE, LITERATURE AND THE ARTS there are four four-year courses of study, the classical, scientific, literary and civic. The classical course offers for its leading studies the Greek and Latin languages; the scientific course, the natural and physical sciences; the literary course, the modern languages; the civic course, history and philosophy. The completion of the courses leads respectively to the degrees: bachelor of arts, bachelor of science, bachelor of literature, and bachelor of philosophy. The advanced degrees offered in this college are: master of arts, science, literature and philosophy, and doctor of philosophy.

The School of Technical and Applied Chemistry, leading to the degree of bachelor of science, is also organized as a part of this college.

A Summer School for Teachers. A four weeks' course of instruction is offered, in various University subjects, for those whose school duties prevent them from taking the regular University courses.

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS offers courses of study, of four years each, in civil, mechanical and electrical engineering; leading to the degrees of civil, mechanical and electrical engineer. This college offers a four years' course of study in science and technology leading to the degree of bachelor of science, with an additional year leading to the engineer's degree in the various lines offered in the college. This college also offers graduate work leading to the degree master of science.

THE SCHOOL OF MINES offers a four years' course of study in mining and metallurgy; upon the completion of which the degrees engineer of mines and metallurgical engineer are conferred.

THE COLLEGE OF AGRICULTURE offers a regular course in agriculture of four years college work; the degree of bachelor of agriculture is conferred on completion of the course.

THE SCHOOL OF AGRICULTURE is open to both men and women, and is a training school for practical farm life and in domestic economy. The college of agriculture is open to graduates of this school.

A Dairy School offers practical instruction in dairying to those who have had some experience in conducting a dairy.

THE COLLEGE OF LAW offers a three years' course of instruction, leading to the degree of bachelor of laws. There is an evening class in this college leading to the same degree. This college offers graduate work leading to the degrees, master of laws, and doctor of civil law.

THE COLLEGE OF MEDICINE AND SURGERY and THE COLLEGE OF HOMEOPATHIC MEDICINE AND SURGERY each offers a four years' course of study, of 8½ months each; upon completion of the prescribed course the degree doctor of medicine is conferred.

THE COLLEGE OF DENTISTRY offers a three years' course of study of nine months each; upon completion of the prescribed course the degree of doctor of dental medicine is conferred.

THE COLLEGE OF PHARMACY offers a two or three years' course of study, leading to the degree of pharmaceutical chemist. This college also offers graduate work leading to the degrees, master of pharmacy, and doctor of pharmacy.

SPECIAL COURSES. In each of the colleges, students, of an advanced age and adequate preparation, are permitted to pursue, under the direction of the faculty, one or two distinct lines of study.

Bulletins of any department sent free to any address, upon application. The full catalogue will be sent only upon receipt of ten cents to cover postage. Address,

THE REGISTRAR,
University of Minnesota,
Minneapolis, Minn.

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(St. Anthony Falls Bank.)

Calendar for 1900-1901

1900. 1901.

JULY

S.	M.	T.	W.	T.	F.	S.
..	..	..	..	..	..	..
1	2	3	**4**	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
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AUGUST.

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SEPTEMBER.

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OCTOBER.

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NOVEMBER.

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DECEMBER.

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JANUARY

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FEBRUARY.

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MARCH.

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APRIL.

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MAY.

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JUNE.

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23	24	25	26	27	28	29
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Calendar, 1900-1901.

OCTOBER	1,	1900	—Entrance examinations and registration.
"	2,	"	—Entrance examinations and registration. Chapel at 4 p. m. Regular classes begin.
"	8,	"	—Literary and class societies meet.
"	16,	"	—Home dairying begins.
"	27,	"	—Examinations.
NOVEMBER	29,	"	—THANKSGIVING DAY; no classes.
"	30,	"	—Examinations.
DECEMBER	21,	"	—Term Examinations.
"	22,	"	—Holiday recess begins.
JANUARY	2,	1901	—Entrance and condition examinations.
"	3,	"	—Classes called; work resumed at 8:15 a. m.
"	8,	"	—Home dairying begins.
"	26,	"	—Examinations.
FEBRUARY,	12,	"	—LINCOLN'S BIRTHDAY; no classes.
"	22,	"	—WASHINGTON'S BIRTHDAY; no classes.
"	24,	"	—Examinations.
MARCH	19,	"	—Term examinations.
"	20,	"	—Term examinations.
"	20,	"	—Alumni re-union.
"	21,	"	—Class day.
"	22,	"	—COMMENCEMENT DAY. Twelfth Annual Commencement.
"	23,	"	—Summer vacation begins.

STANDING COMMITTEES.

Examinations and Registrations: Robertson, Drew, W. Boss, Mahood, Mrs. Meredith Keyes.
Library: Hays, Pendergast, Reynolds.
Absence and Tardiness: Mahood, Reynolds, Meredith.
Military Drill: Green, Haecker.
Catalogue: Lugger, Aldrich, A. Boss, Vye.
Entertainment: Robertson, Mrs. Meredith, Vye, Shaw.
Program: Robertson, Aldrich, Vye.
Specials: Liggett, A. Boss, Vye.

The College of Agriculture.

THE FACULTY.

CYRUS NORTHROP, LL. D., *President.*
WILLIAM M. LIGGETT, *Dean.*
SAMUEL B. GREEN, B. S., *Professor of Horticulture and Forestry.*
OTTO LUGGER, Ph. D., *Professor of Entomology.*
HENRY W. BREWSTER, Ph. D., *Professor of Mathematics.*
HARRY SNYDER, B. S , *Professor of Agricultural Chemistry.*
T. L. HAECKER, *Professor of Dairy Husbandry.*
M. H REYNOLDS, M. D., V. M., *Professor of Veterinary Medicine and Surgery.*
WILLET M. HAYS, M. Agr., *Professor of Agriculture.*
THOMAS SHAW, *Professor of Animal Industry.*
VIRGINIA C. MEREDITH, *Professor of Home Economics.*

NOTE—The instruction not given by the faculty of the college of agriculture is given by the faculties of the college of science, literature and the arts, the department of law, and the department of medicine.

COMMITTEE ON COLLEGE WORK.

HAYS, SNYDER, BREWSTER.

PURPOSE AND SCOPE.

The college course emphasizes the sciences of botany, chemistry, geology, physics and zoology, the importance of plant and animal production and the upbuilding of rural homes and farm life. In the first two years following after the four years of excellent preparation received by the students in the school of agriculture, little opportunity for electives is given, and twelve terms of scientific work in botany, chemistry, physics and zoology are required during the freshman and sophomore years. The student may elect a six-term course in either botany or zoology, or a three-term course in each. In chemistry and physics the student elects a four-term course in one and a two-term course in the other. In the last two years the course for men is all elective, while for women additional subjects in literature and the arts are required. German, French and Scandinavian are deemed of greater value in this course than the classics, and the latter are not included among the electives. The technical subjects in agriculture and household economics are offered in the junior and senior years, when the freedom for election enables the student to choose as a specialty a major science, an agricultural or a household subject around which to group related elective subjects. The elective courses during the

last two years give opportunity for liberal culture in art, literature and philosophy and for becoming proficient in scientific research work in some of the many problems pressing for solution in the development of the state and national agricultural experiment stations. This course is designed to give a broad preparation for farm life or for the work of the specialist in the sciences and arts relating to rural industries and rural life.

REQUIREMENTS FOR ADMISSION.

Candidates for admission to the freshman class are required to show attainment equal to that represented by the certificate of graduation from the school of agriculture. Graduates of the school of agriculture who have completed the studies required for entrance to this college are admitted on the presentation of their certificates. After 1901 all graduates of the school of agriculture before admission to this college are also required to present with their certificates testimonials showing that they have completed the fourth year's work as required in the school of agriculture. Graduates from state high schools may be admitted to the freshman class after spending a year in the school of agriculture pursuing such studies as the faculty may require. Before graduation, however, all of the required work in the school of agriculture must be completed.

REQUIREMENTS FOR GRADUATION.

After the completion of the prescribed course of study, including all of the required work and the requisite amount of elective work, students will be recommended for graduation with the degree of Bachelor of Agriculture.

COURSE OF STUDY.

FRESHMAN YEAR.

FIRST TERM.	SECOND TERM.	THIRD TERM.
Botany or Zoology, 4.	Botany or Zoology, 4.	Chemistry, 4.
German, 4.	German, 4.	Botany or Zoology, 4.
Drawing, 4.	Drawing, 4.	German, 4.
Solid Geometry, 4.	Trigonometry, 4.	Rhetoric, 4, I., p. 94, 3.
1, Military Drill, 2.	1, Military Drill, 2.	1, Military Drill, 2.
2, Physical Culture, 2.	2, Physical Culture, 2.	2, Physical Culture, 2.

SOPHOMORE YEAR.

FIRST TERM.	SECOND TERM.	THIRD TERM.
Chemistry, 4.	Chemistry, 4.	Chemistry, 4.
German, 4.	German, 4.	German, 4.
Botany, Zoology or Psychology, I., 89, 4.	Botany, Zoology or Psychology, I., 89, 4.	Botany, Zoology or Logic, I., 89, 4.
Physics or 2 History, II., p. 80, or 2 Rhetoric, II., p. 94, 4.	Physics or 2 History, II., p. 80, or 2 Rhetoric, II., p 94, 4.	History II., p. 80, or Rhetoric, VIII., p. 94, 4.
1, Military Drill, 2.	1, Military Drill, 2.	1, Military Drill, 2.
2, Physical Culture, 2.	2, Physical Culture, 2.	2, Physical Culture, 2.
Rhetoricals, 1.	Rhetoricals, 1.	Rhetoricals, 1.

1 For men. 2 For women.

Roman numerals refer to courses of study as mentioned under the several departments. Pages refer to general catalogue.

In the junior and senior years men are required to elect twelve subjects from among those offered below in agriculture, agricultural chemistry, animal husbandry, dairy husbandry, entomology, horticulture and forestry, and veterinary medicine and surgery. They are also required to elect twelve terms' work from the following subjects given in the college of science, literature and the arts: Animal biology; botany; chemistry; physics; mathematics; engineering; English; English literature; geology; mineralogy; political economy; history; astronomy; pedagogy; psychology; history of philosophy; social philosophy; elements of contracts; Commentaries of Blackstone; Scandinavian; French; and German.

All students must advise with the Dean or the committee on college work concerning all electives. The following table gives the term in which each course of the agricultural subjects is given:

JUNIOR AND SENIOR AGRICULTURAL ELECTIVES FOR MEN.

Professor.	Fall.	Winter.	Spring.
Green	.....	Hort. I, II, III and IV	Hort. IV; Forestry I, II
Haecker	*I	II, 1900-1; III, 1901-2, IV	II, 1900-1
Hays	II-1900-1; I-1901-2	.....	III, 1901-2
Lugger	.....	Entomology	.....
Reynolds	I	II	III
Shaw	I	II, III	.....
Snyder	IV, 1900-1; III; VI	VI	V, 1900-1: VI; VII

Roman numerals refer to courses outlined on future pages in the several divisions.

When the number of the course is followed by the year, the course is given only in years beginning on the even or odd number as designated. In case of a few courses not listed, special arrangements will be made with the professor in charge.

A modified course is being arranged for women. In the junior year, the following subjects are prescribed:

FIRST TERM.	SECOND TERM.	THIRD TERM.
History, V., p. 81, 4.	History, V., p. 81, 4.	History, V., p. 81, 4.
Eng. Lit., IX., p. 74, 4.	Eng. Lit., XI., p. 74, or French, 4.	Eng. Lit., XIII., p. 74, or French, 4.
Lit. Criticism, IV., p. 94, 4.	Lit. Criticism, IV., p. 94, 4.	Lit. Criticism, IV., p. 94, 4.
One Agr. Elective, 4.	One Agr. Elective, 4.	One Agr. Elective, 4.
Physical Culture, 2.	Home Economics, 1.	

In each term of the senior year, four 4-period subjects or their equivalent are required of women; these to be elected from among the courses offered in the college of agriculture, the college of science, literature and the arts, and the department of medicine, as outlined below.

FIRST TERM.	SECOND TERM.	THIRD TERM
Agricultural Chemistry.	Agricultural Chemistry.	Agricultural Chemistry.
Eng. Lit., X., p. 74, or French.	Eng. Lit., XII., p. 74, or French.	Eng. Lit., VI., p. 74, or French.
Geology, I., p. 76, 4.	Geology, II., p. 76, 2.	Rhetoric, Lectures History of Art, V., p. 94.
Horticulture or Floriculture.	Farm Economics.	Philosophy—Principles of Ethics, VI., p. 90,
Bacteriology I. (a), p. 232, 2.	Animal Feeding, III., p. 170.	Sanitary Science, II. and III. p. 93, 2.
Philosophy, Æsthetics, III., p. 90.	Philosophy, History of Ethics, V., p. 90	Political Science, Minn. Pol. Institutions, II., p. 92.
Pedagogy, I., p. 88.	Home Economics, 2.	Horticulture or Floriculture.
Agriculture, III.	Elocution, IX., p. 94.	Poultry.
Physical Culture.	Dairy Husbandry, I., p. 170.	

Other elective courses in domestic science, and also in domestic arts, will be provided and published in a later bulletin. Women who are sufficiently advanced may study music or art during the senior year; provided that no student may receive more than three credits in music and art together.

COURSES OF INSTRUCTION.

AGRICULTURE.

A portion of the work in agriculture is in the form of lectures. The writing of papers on special subjects is made a feature. Research work is arranged for in many cases, and practice work on the farm and in the laboratory is provided. The aim is to have students get experience in field agriculture, both practical and experimental, and in demonstration instruction. The work is a continuation of the agriculture studies in the school of agriculture, each subject being treated from the more technical standpoint.

Course I. Field crops and seeds.

In this course are considered the botany, cultivation, use and place in the rotation of the various cereal, forage, root, fiber, sugar, and miscellaneous crops. Special attention is given to the subjects of permanent, rotation, annual, and shift pastures and soilage; to permanent and rotation meadows; and to the production and preservation of all kinds of dry-cured and ensilaged fodders.

Course II. Crop breeding.

Heredity, variation, extensive selection; field crop nursery management; producing new qualities by crossing and by change of environment; out-crossing versus inbreeding and self-fertilization; originating varieties and improving standard varieties; choice of foundation stocks; methods of selecting; crossing followed by selection; increasing newly originated stocks; testing new kinds by comparing them with standard varieties; methods of disseminating new varieties.

Course III. Agricultural engineering.

Selecting farms, deciding upon systems of farming, planning farms, subduing new soils, farm building, fences, roads, tillage, irrigation, implements and machinery.

Course IV. Farm economics.

Field management, rotation, weeds, labor, prices, purchases and sales, farm finances, the permanent farm investment, agricultural pedagogics.

AGRICULTURAL CHEMISTRY.

In the freshman and sophomore years either two or four terms of chemistry are required.

Course I. (*a*) *General agricultural chemistry.* *Freshman iii.*

Lectures and recitations. Particular attention is given to the study of the elements and compounds which are of the most importance in agriculture. The laws governing the combination of elements by weight and volume are illustrated by means of numerous problems. Chemical nomenclature and the periodic system of classifying the elements are prominent features of the work.

(*b*) A continuation of I (a). *Sophomore i.*

Course II. (*a*) *Agricultural qualitative analysis.* *Sophomore ii.*

This course is arranged to meet the special wants of agricultural students. Six hours per week are given to the laboratory work, and one period to a lecture and recitation. The writing of equations and the study of the principles involved in separation of the various groups and the individual compounds and elements are characteristic features of this work. The qualitative analysis of insoluble substances is emphasized. It is the object of this course to familiarize the student with the processes employed in qualitative analysis so that he may be able to determine the composition of all ordinary substances, particularly of those that are of the most importance in agriculture.

(*b*) A continuation of II (a). *Sophomore iii.*

Course III. Agricultural quantitative analysis. *Junior or senior i.*

An elementary course in quantitative analysis. The principles involved in gravimetric and volumetric analyses are studied. Three periods per week are given to laboratory work and one period to a recitation and lecture. The work includes the gravimetric and volumetric determinations of iron, acidimetry, the gravimetric determination of phosphorus pentoxid, and the volumetric determination of calcium oxid. The object of this course is to prepare the student for special work in agricultural chemistry.

Course IV. The chemistry of foods. *Junior or senior, i.*

Lectures. This course treats of the chemistry of human and animal foods. The chemistry of plant growth, the food value of the various organic compounds contained in plants, the influences which soil and climate exert upon plant growth, and the various factors which influence the composition and value of farm crops, are studied. The chemistry of animal nutrition and human foods is also considered. It is the object of this course to familiarize the student with the more recent investigations which have a bearing upon the chemistry of human and animal foods, and to enable him to apply these investigations to the best advantage in the production and use of foods. Ample facilities are offered in both the laboratory and library for the study of this subject. (Given only in alternate years. Given in 1900).

Course V. The chemistry of soils and fertilizers. *Junior or senior, iii.*

Lectures. The chemical changes that take place in the soil; the various sources of plant food; the power which crops possess of obtaining food from the soil; nitrification; the laws governing the increase and decrease of the soil nitrogen and the organic compounds of the soil and the part which they take in fertility,—are some of the more important topics considered. The influence which various methods of farming have upon the fertility of the soil and the best methods for conserving fertility are studied. The subject of judging, rating and scaling soils forms a part of the work. (Given only in alternate years. Given in 1900).

Course VI. The analysis of agricultural products. *Junior or senior, i., ii., iii.*

Lectures and laboratory practice. (*a*) The determination of nitrogen in food products, the determination of sugar by volumetric, gravimetric and polariscopic methods, and the determination of starch.

(*b*) The analysis of dairy products, including the proximate analysis of milk, butter and cheese, the determination of volatile fatty acids, iodin absorption number, the chemical and physical properties of fatty bodies and the determination of adulterated dairy products.

(*c*) The proximate analysis of human and animal foods, including fodders, grains and milled products, particular attention being given to the analysis of wheat and flour for commercial purposes.

Course VII. The analysis of soils and fertilizers. *Junior or senior, iii.*

Lectures and laboratory practice. The chemical analysis of soils by means of strong and weak solvents. This course embraces a study of the principles involved in soil investigations, including the physical analysis of soils. Special elective work is also offered in this subject.

ANIMAL INDUSTRY.

Course I. Animal breeding.

Under this head lectures are given on the laws which govern breeding. The principles are considered upon which a standard of excellence is based and various standards are compared. Heredity in its various features is discussed, not only with reference to characteristics that are normal, but also with reference to those that are abnormal and acquired. Careful consideration is given to the heredity of diseases. The law of correlation is dwelt upon. Prepotency is discussed especially from the standpoint of practical utility. The good and evil that may result from

in-and-in breeding and line breeding are pointed out. Fecundity and the influences which affect it are examined. The relative influence of parents, the influence of a previous impregnation and intra-uterine influences. The many and far-reaching influences of nutrition are dwelt upon and quality in live stock, the coat and influences which affect it, and the outcome of artificial conditions generally are gone over with much care. Early maturity, pedigree and animal form as an index of qualities are defined and their great practical value is shown. The art of selection receives special attention. Cross-breeding, grading, the formation of breeds, and the influences of environment are carefully examined.

Course II. Feeding animals.

The question of feeding is considered from both the scientific and the practical standpoints. The foundation for succeeding lectures is laid by first considering some important principles which govern feeding. Feeding rations and nutritive ratios are next discussed and these are followed by lectures on feeding stuffs and the different methods of preparing foods for feeding. Then follows the feeding and management of cattle treated chiefly from the practical standpoint. Lectures are given on rearing calves during the milk period and store animals from the weaning to the finishing period; on finishing for the block on grass, also in the stall; on the selection and care of both males and females of the best breeds, and on stabling suitable for cattle. Similarly the feeding and management of sheep and swine are considered. Careful attention is given to the discussion of wool and its properties and to sheep for wool production, for mutton production, and for both uses combined.

Course III. Pasturing live stock.

Lectures are given with reference to the production of pasture other than grass suitable for the various classes of domestic animals kept on the farm. The most approved methods of pasturing these are also discussed. In these lectures every opportunity available is embraced of illustration by direct reference to living animals and an examination of the various kinds of food more commonly used in feeding them.

DAIRY HUSBANDRY.

Course I. Dairy stock and dairy farm management.

Lectures, one term, three hours per week. Practice work, one term, one hour per week.

This course is given during the fall term of the junior year. The lectures cover the breeding, rearing and management of dairy stock, the points and characteristics essential in animals intended for the dairy, practice work in judging dairy stock, and the management of the dairy farm.

Course II. Dairy feeding.

Lectures, two terms, two hours per week.

This course consists of lectures covering both the scientific and practical questions underlying the principles of feeding. Practice work is given in compounding rations, estimating comparative value of food stuffs and other problems connected with the subject. (Given in years beginning with even numbers).

Course III. Farm dairying. Lectures and practice work, one term, two hours per week.

In this course the student receives lectures on milk, its care, the various methods of creaming it, care of the cream, and the manufacture of butter and sweet curd cheese A student taking this course devotes the greater portion of his time to practice work in the "Farm Dairy Room." (Given in years beginning with odd numbers. One-half credit).

Course IV. Factory course in butter and cheese.

This course is offered in January of each year. The work comprises two lectures a day, one on butter and one on cheese, and practice work two afternoons a week in butter-making and two afternoons in cheese-making. Any student may take either part of this course and obtain a half credit.

Course V. Dairy laboratory work.

The work in this course will not be offered during the year 1900-1901.

ENTOMOLOGY.

The study of entomology will be of a practical nature and only sufficient work will be given in dissecting and classifying insects to enable the students to recognize them as being useful, injurious or indifferent to agriculture and horticulture. The various artificial remedies and insecticides known to be of benefit will be discussed, as well as natural remedies based upon the life history of the insects. Injurious and beneficial insects found in Minnesota will be considered, with a view of fighting the former and protecting the latter. The relationship existing between insects and man, between insects and insects, and between insects and plants will be studied in detail. Students wishing to make a special study of economic entomology can find work in the laboratory during the summer, providing they show aptitude for such work and already possess the preliminary training.

HOME ECONOMICS.

This course is intended to give breadth, strength and thoroughness to the concept of home, and also an appreciation of its privileges as a career for educated women.

Course I.

Lectures once a week during the second term of the junior year. The evolution of the home; the family as a social and economic institution; the relation of the home to civic life; the home as a place and an opportunity for the right development of the physical and spiritual natures.

Course II.

Lectures once a week during the second term of the senior year; home administration; the organization of a home; generic lines of expenditure; domestic service; and disposition of waste.

HORTICULTURE.

Course I. Fruit growing.

Lectures one term. The study of the geography of fruit growing; outlook for fruit growing; planting, tilling and fertilizing of fruit lands; diseases and insects injurious to fruits; spraying; harvesting and marketing of fruit; varieties of fruits.

Course II. Vegetable growing.

Lectures one term. Geography of vegetable growing; tilling and fertilizing vegetable lands; irrigation and rotation of crops; seed growing and seed testing; vegetables under glass; pollination; diseases and insects injurious to vegetables and their prevention; harvesting and marketing; varieties of vegetables.

Course III. Green houses and their management.

Lectures and laboratory work. Greenhouse instruction and management, temperature, soil, watering, benches; propagation by seeds, cuttings, layers and graftage, prevention of diseases and extermination of insects injurious to vegetables; rest and growth periods of plants; plants for greenhouse cultivation.

Course IV. Nursery work.

Lectures and laboratory work. Seedage; layerage; cuttage; graftage; planting; pruning; thinning; storage of nursery stock; tillage of nursery lands; insects; diseases injurious to the nurseries and their prevention.

Course V. Plant breeding.

Lectures and laboratory work. The fact and philosophy of variation; crossing of plants; origination of domestic varieties.

FORESTRY.

Course I. Lectures.

The forestry situation in this country and its literature; lumbering in Minnesota; forest influences; forest supplies; forest management; prairie forestry.

Course II. Lectures and field work.

Characteristics of forest and ornamental trees that are hardy in Minnesota; their value for timber and other purposes and methods of propagation.

MATHEMATICS.

Mathematics, as pursued in the college of agriculture, aims primarily at mental discipline and only secondarily at application to lines of practical work.

Geometry as a discipline for clear perception, accurate statement and logical inference is required, both plane and solid.

Trigonometry is required, both as a mental discipline and for application to practical work in surveying.

VETERINARY MEDICINE AND SURGERY.

The work in this department continues through the three terms in the junior year. Instruction is given by text-book, lectures, collateral reading and by practice work in the hospital. The lectures are illustrated by means of skeletons, manikins, charts and by the living animal. Anatomy of the digestive organs and the higher physiology of digestion are given prominence in this work.

Theory and practice of medicine are carried further than in the school of agriculture course. Infectious diseases of domestic animals are studied with reference to causes, recognition, prevention and methods of control. Certain medicines which the intelligent stockman should understand are studied with reference to uses, doses and methods of administration.

Course I.

This is a continuation of the last term's work in the school of agriculture. It includes an advanced study of the veterinary physiology of digestion, taking up the digestive fluids, nervous mechanism of digestion, absorption and digestion of grains and fodders. It also includes a study of body nutrition, body income and expenditures, sources of heat supply and heat loss, and metabolism.

Course II.

The muscular system, including muscle currents, results of contraction, muscle fatigue and laws of muscular work. The nervous system, including irritability of nerves, electric phenomena of nerves, reflex action, and sympathetic nervous system. This course also includes the physiology of the skin and nitrogen excreting apparatus and a study of the locomotor apparatus, including shoeing, diagnosis and treatment of common forms of lameness.

Veterinary Physiology, by F. Smith, is used as a text-book and guide for this work in courses I. and II., but students are required to do collateral reading.

Course III.

This course includes diagnosis and treatment of common diseases; common medicines in their doses, uses, dangers and methods of administration.

GRADUATE WORK.

I. Applicants for second work in the college of agriculture shall be referred to the dean of the department of agriculture and to the committee on college and graduate work, which shall examine said applicants and have general charge of graduate courses and work, reporting to the faculty of the college of agriculture.

II. A candidate for a graduate degree in the agricultural department must take his major subject in one of the divisions of the department of agriculture, but may take one or both of his minors in other departments of the University, as the faculty of the college of agriculture may decide.

III. The degree of Master of Agriculture will be conferred on a bachelor of this or any other reputable agricultural college who, not sooner than one year after graduation, if a resident graduate student at this agricultural college, shall pass an examination in certain prescribed lines of study and present a satisfactory thesis.

IV. All general regulations of the college of science, literature and the arts, governing candidates for the master's degree as to preparation, method of selecting work, amount of work required, degree of proficiency expected, and the time and manner of conducting the examinations, shall apply to candidates for master's degrees in the college of agriculture.

V. The degree of Doctor of Philosophy will be conferred by the college of agriculture on bachelors of this or any other reputable agricultural college within not less than three years after graduation therefrom under conditions similar to those prescribed by the faculty of the college of science, literature and the arts.

The School of Agriculture.

FACULTY.

CYRUS NORTHROP, LL. D., *President.*
WILLIAM M. LIGGETT, *Dean.*
HENRY WEBB BREWSTER, Ph. D., *Principal, Mathematics.*
SAMUEL B. GREEN, B. S., *Horticulture, Forestry.*
OTTO LUGGER, Ph. D., *Zoology, Entomology.*
CHARLES R. ALDRICH, *Drawing Farm Buildings.*
WILLIAM ROBERTSON, B. S., *Physics, Botany.*
J. A. VYE, *Penmanship, Accounts.*
HARRY SNYDER, B. S., *Chemistry.*
T. L. HAECKER, *Dairy Husbandry.*
M. H. REYNOLDS, M. D., V. M., *Physiology, Veterinary Science.*
WILLET M. HAYS, M. Agr., *Agriculture.*
THOMAS SHAW, *Animal Industry.*
J. M. DREW, *Blacksmithing. Poultry.*
ANDREW BOSS, *Dressing and Curing Meats, Farm Machinery.*
WILLIAM BOSS, *Carpentry, Power Machinery.*
E. W. MAHOOD, M. A., *Arithmetic, Civics, and Director of Gymnasium.*
JUNIATA L. SHEPPERD, M. A., *Cooking, Laundering.*
MARGARET BLAIR, *Sewing.*
VIRGINIA C. MEREDITH, *Preceptress, Home Economics.*
CHAS. F. KEYES, A. B., *Registrar, Reading and History.*
SOPHIE M. PENDERGAST, B. L., *English.*
ARTHUR C. KOERNER, *Music.*

When applying for admission or information address J. A. Vye, Secretary, St. Anthony Park, Minn.

OPENING.

The school year opens October 1, 1900, and closes March 22, 1901. The fall term closes Friday, December 21st, and the winter term begins Wednesday, January 2d, giving a vacation of eleven days. Owing to the shortness of the school year, it is very desirable that students be on hand the first day of the term, that registration may be completed and work begun promptly. Students registered in the fall term will not be received after the first two days of the winter term, unless they present a reasonable excuse for such delay.

ADMISSION.

Applicants who have completed a common school course in English grammar, arithmetic, history of the United States and geography, as prescribed by the state department of public instruction will be admitted to the regular course without examination.

State High School Board certificates are accepted for work in English, physiology, algebra, geometry and civics.

Applicants who cannot complete the common branches at their home district may be admitted to a preparatory class if they can pass examinations in reading, letter-writing, and arithmetic through fractions, or bring third grade certificates from their county superintendents. But all students who can complete the common branches in their home schools will not be admitted.

Applicants for admission after the opening of the term will, in addition to the regular entrance examinations, be required to show proficiency in the work done by the class up to the time of their application. All who cannot enter by the 1st of November should wait until the beginning of the winter term.

The Dining Hall.

EXPENSES.

The cost to the student for board and washing is the actual cost for maintaining the table and caring for the house. This does not exceed $3 per week. An assessment of $12 is made in advance for the purchase of provisions at cash prices. At the end of each month the exact cost of board is calculated and an assessment made. At the final settlement the $12 assessed the student when he first entered the school is credited to his board account. The culinary department is managed by an experienced matron and all the buildings are under the supervision of the principal. The buildings are all lighted with electric lights and warmed by steam. The sleeping-rooms are each furnished with a bedstead, mattress, dressing bureau, chair, and table.

No deductions in charges are made for absence of less than four days. If students are compelled to be absent for that length of time they will be allowed half rates, *if they arrange with the matron before leaving.*

Text-books are furnished at a term rental of $1 to students who do not desire to purchase.

FEES.—Each student pays an incidental fee of $1.50 per term, and also pays for breakages of apparatus used in practical work.

DEPOSIT.—In addition to the assessment of $12 for board, a deposit of $5 is required of each student as a guaranty for the return of all books and other articles borrowed.

Money required —On entering school the student must make a payment of $19.50; $12 on board, $5 deposit, $1 book rent, and $1.50 fee. If books are purchased on entering, no rental is charged.

The total expense for the year need not exceed $85 to each student.

MILITARY DRILL UNIFORM.—All male students are required to provide themselves with the prescribed uniform, which consists of navy blue blouse, trousers and cap, and is as neat and economical a dress as the student can obtain. The suit complete, to measure, will be furnished under special contract for $10.75.

Each student furnishes four sheets, one pair of blankets, one quilt, one bed spread, one pillow, three pillow cases, two bath towels, comb and brush.

An assignment of rooms will be made on the day before commencement and will hold good only until and including the second day of the following term, when the student's presence will be necessary to make good his claim.

Students wishing to retain their rooms after vacation must be on hand when the second term opens, or pay one-half the price of board and room for the time they are late. Students who do not engage rooms in advance may be forced to find sleeping rooms elsewhere at an additional cost of 50 cents per week.

REQUIREMENTS FOR GRADUATION.

First—The completion of the prescribed course of study with an honorable standing in deportment.

Second—An essay of not less than one thousand words upon a topic connected with agriculture or home economics.

Third—For young men, a practical experience in field work at the University farm or elsewhere, as shall appear in reports received from responsible sources.

REQUIREMENTS FOR ENTERING THE COLLEGE OF AGRICULTURE.

The following year's work is offered and required of students desiring to enter the college of agriculture:

FIRST TERM	SECOND TERM
*Algebra, [5]	Algebra, [5]
*Geometry, [5]	Geometry, [5]
English, [5]	English, [5]
Elective, [5]	Civics, [5]

*Recitations in geometry begin in Book III., Wentworth, and in algebra at highest common divisor.

The first building erected upon the campus has been remodeled and furnished for a home for the young men. It contains on the first floor the library; a large reading room supplied with good reading and parlor games; a general sitting room; also a parlor in which students receive visits from friends. In the basement are rooms specially adapted for change from recitation rooms into dining rooms for class parties, which enables students to learn the art of receiving and entertaining company.

The building for young women contains a large sitting room for general use; a parlor for more special use; rooms for the preceptress; and thirty suites of rooms for sixty students, each suite consisting of a study room for two with two alcove sleeping rooms adjoining.

This gives each student a separate sleeping room, a study room for herself and one room-mate, the free use of sitting room and parlor in the girls' home, and the benefit of class parties in the Home building.

THE HOME

In the large sitting room there are papers, magazines, books, and a piano, which afford pleasant recreation.

STUDENTS' DEBATING SOCIETIES.

Societies for the purpose of improvement in elocution and debate and for obtaining instruction in the form of lectures give excellent opportunities for entertainment and culture.

STUDENTS' CHRISTIAN ASSOCIATION.

This society has for its objects the study of moral and religious subjects and the holding of regular weekly prayer meetings and conference meetings. All students, regardless of creed, are welcome to membership; no sectarian differences are allowed to be discussed at the meetings or in the reading rooms.

The Young Men's Christian Association of the school will station several of its members at the depots to meet and direct incoming students on the

arrival of the trains, Monday and Tuesday, October 1st and 2d. A member bearing a badge lettered, "Y. M. C. A., S. A. U. M.," will be at each of the following depots: Great Northern, in St. Anthony Park; Union, in St. Paul; Milwaukee, in Merriam Park; and Union, Milwaukee and St. Louis, in Minapolis. Trunks will be transferred the first and last weeks of the term without expense to students At other times a fee of 25 cents will be charged.

ATHLETIC ASSOCIATION.

The students have a well-organized athletic association and a well-equipped gymnasium. A competent instructor is in charge each evening. An opportunity is thus given for a healthful amusement and for needed physical exercise.

GIRLS' HOME BUILDING.

LIBRARY.

The library contains five thousand books of reference, besides five thousand pamphlets, including reports, bulletins, etc.

The library is supplied with a card catalogue from the United States Department of Agriculture of all reports and bulletins issued by the different experiment stations. This enables one to find some reference on nearly every agricultural subject. In connection with the library is the reading room where all the leading agricultural papers, as well as other leading periodicals, are kept on file for the use of the students.

COURSE OF STUDY.

FIRST YEAR.

FIRST TERM.

Plant Study [5]

*Drawing [2]

*Music or Gymnasium Work [1]

English [5]

*Blacksmithing [1]
*Carpentry [2]
Carpentry Lecture [1]
*Military Drill [1]
Agriculture [3]

or

*Laundering [1]
*Physical culture [1]
*Sewing [3]
Social Culture [1]
Field Agriculture [3]

SECOND TERM.

Plant Study [5]

*Farm Accounts [2½]

*Music or Gymnasium Work [1]

Physiology [5]

Study of Breeds [3]

*Carpentry [2]
Carpentry Lecture [1]
*Drawing (farm buildings) [2]
*Blacksmithing [1]
*Military Drill [1]

or

†Cooking [2]
*Drawing (farm houses) [2]
Home Management [1]
*Physical Culture [1]

SECOND YEAR.

FIRST TERM.

Dairy Chemistry [2]

*Dairy Husbandry [2½] { Dairy Lectures, Dairy Practice, Dairy Breeds }

Fruit Growing [3]

*Music or Gymnasium Work [1]

Algebra [5]

Breeding [2½]
*Military Drill [1]
Physics [5]

or

*Cooking [2]
Household Art [1]
*Physical Culture [1]
*Sewing [2]

SECOND TERM.

Agricultural Chemistry [5].

*Dairy Husbandry [2½] { Dairy Stock Lectures, Dairy Practice, Dairy Feeding }

COURSE OF STUDY—*Continued.*

*Music or Gymnasium Work [1]
Physics [5]
Vegetable Gardening [3]

Field Crops [5] / *Military Drill [1] — or — *Cooking [2] / Home Economy [1] / *Physical Culture [1] / *Sewing [2]

THIRD YEAR.

FIRST TERM.

*Agricultural Chemistry [5]
Forestry [3].
* Music or Gymnasium Work [1]
Entomology and Zoology [5]
Poultry [3]

*Handling Grain and Machinery [1] / *Veterinary Science [2½] — or — *Cooking [2] / *Sewing [2]

SECOND TERM.

Civics or Geometry [4]
*Dressing and Curing Meats [1]
Plant Propagation [3]

Feeding [3] / Soils and Fertilizers [5] / *Veterinary Science [2½] — or — *Cooking [3] / Domestic Chemistry [3] / Domestic Hygiene [1] / *Sewing [3]

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*Figures in brackets indicate the number of hours per week in which the subject is pursued. All work in subjects marked thus * extends through double time in the daily program.

† Three periods.

One essay and one declamation are required of each student in each term of the first two years. Those taking the regular work in the literary societies will be excused from the declamation.

SCHOOL OF AGRICULTURE—PROGRAM, FALL TERM, 1900.

INSTRUCTOR.	8:15-9:00.	9:05-9:50.	9:55-10:40.	10:45-11:30.	11:40	1:15-2:00.	2:05-2:50.	2:55-3:40.	3:45-4:30.	4:35.
Aldrich					ASSEMBLY.	C Drawing, 2, 5 or 1, 4.		C Drawing, 2, 5 or 1, 4.		
Blair						B Sewing, 2, 4. C Sewing, 1, 3, 5.		A Sewing, 2, 4. C Sewing, 1, 3, 5.		
Boss, A.						A Handling Grain and Machinery.				
Boss, W.		A Power Machinery, 0.				C Carpentry, 1, 4 or 2, 5. Carp. Lec. 3.		C Carpentry, 1, 4 or 2, 5. (Carp Lec. 3		
	B Algebra.	G Geometry.	G Algebra.							
Drew			A Poultry, 1, 2, 3.			C Blacksmith'g, 1, 4 or 2, 5.	Blksm. Lct. 3.	C Blacksmith'g, 1 4 or 2, 5.	Blksm. Lec. 3	
Green			B Fruit Cult. 1, 2, 3.	B Fruit Cult 1, 2, 3.		A. Forestry, 1. 2, 3.				
Haecker						B Dairy Lect. 1, 5. Breeds.	B Dairy Practice, 1, 3, or 5.		B Farm Dairy, 1, 5.	
Hays	C Agricul. 1, 2, 3.	C Agricul. 1, 2, 3.	C Field Agr. 1, 2, 3.							
Keyes						P Geog.	P History.	P History.		
Koerner						Music, 6:15 to 7:00 p. m., 1, 4 or 2, 5.				
		C Phys. Cult. 2 and 4.	B Phys. Cult. 2 and 4.							
Lugger	A Entomol'y and Zoology.									
Mahood	B Algebra	P. II. Arith.	P. I. Arith.			Gymnastic Work at 8:30 p. m., 1, 4 or 2 5.				
Meredith		C Soc. Cult 5.					B Household Art, 1.			
Pendergast	G English.	P. I. Eng.	P. II. Eng.	C English						
Reynolds				(C Physiol.)				A Vet Science, 5 Pds 2, 4.		
Robertson	C Botany	C Botany.	B Physics.	B Physics.						
Shaw			(C Study of Breeds, 4, 5.)			B Breeding.	(C Study of B., 3.)		(C Study of Br. 3.)	
Shepperd						B Cooking, 3. A Cooking, 4, 5.		C Laund. 2 5.	C Laund. 1,4 B Cooking, 4.	
Snyder		A Agricult'l Chemistry.	B Dairy Chem., 4, 5.	B Dairy Chem., 4, 5. A I. Lab. Ag. Chem. 1,2,3,4.				Laboratory Agr. Chem. A. II. 1, 3.		
Vye	P Penmans'p					(C Accounts, 1, 3, 4, or 2, 3, 5 5 Pds.)		(C Accounts, 2, 3, 5, or 1, 3, 4. 5 Pds.)		
										Military Drill

SCHOOL OF AGRICULTURE—PROGRAM, WINTER TERM, 1901.

INSTRUCTOR.	8:15-9:00.	9:05-9:50.	9:55-10:40.	10:45-11:30.	11:40.	1:15-2:00.	2:05-2:50.	2:55-3:40.	3:45-4:30.	4:35.
Aldrich					ASSEMBLY.	C Drawing, 2, 5 or 1 4.		C Drawing, 2, 5 or 1, 4.		
Blair						B Sewing, 2, 4.		A Sewing, 1, 3, 4.		
Boss, A						Dressing and Curing Meats, 2 Pds.				
Boss, W						C Carpentry, 1, 4 or 2, 5. (Carp. Lec. 3)		C Carpentry, 2, 5 or 1, 4. Carp. Lect. 3		
		A Geom. 2, 3, 4, 5.	G. Geom.	G. Algebra.						
Drew						Blacksmithing, 1, 4 or 2, 5.	(Blks. Lec. 3.)	Blacksmithing, 1, 4 or 2, 5.	Blks. Lec. 3.	
Green			B Veg. Gard. 2, 3, 4.	B Veg. Gard. 2, 3, 4.		A Plant Prop., 1, 4.		A Plant Prop., 5.		
Haecker						B Dairy Stk. Feeding, 1, 5.	B Dairy Practice, 1, 3 or 5.			
Hays	B Field Crops.		(C Agric. 1, 2, 4.)							
Keyes						P Geog.	P History.	P History.		
Koerner							Music, 6:15 to 7:00 p. m., 1, 4 or 2, 5.			
	B Phys. Cult 2, 4.	C Phys. Cult. 2, 4								
Mahood		A Civics, 2, 3, 4, 5.	P. I. Arith.	P. II. Arith.			Gymnasium Work at 8:30 p. m. 1, 4 or 2, 5.			
Meredith	B Home Econ., 5.	C Home Managem't, 5	Domestic Hygiene, 1.							
Pendergast	P. I, Eng.	G. English.	P. II. Eng.	(C English.)						
Reynolds				C Physiol.				A Vet. Sci, 5 pds. 2, 4.		
Robertson	C Botany.	C Botany.	B Physics.	B Physics.						
Shaw			Study of B. 3, 5.			A Feed 2, 3, 5. C Study of Breeds, 1, 4.	C Study of B., 3.		C Study of B., 3	
Shepperd						A Cooking, 2, 3, 5.		C Cooking, 1, 4. B Cooking, 2, 3, 5.		
Snyder	A Domes. Chem., 3, 4, 5.	B Agr. Chem.	A Soils and Fertilizers.							
Vye	Penmanship.					C Accts. 1, 3, 4, or 2, 3, 5. (5 Pds.)		C Accounts, 1, 3, 4 or 2, 3, 5 (5 Pds.)		
										Military Drill

CHARACTER OF INSTRUCTION.

AGRICULTURE.

The instruction in agriculture continues through the course and is outlined as follows:

Instruction is given in the selection and management of farms; soils and soil formation; drainage; tillage; road making and fence building. The production of grains and grasses, clovers and other forage plants; the management of grass lands; the rotation of crops; and the management of fields in relation to fertility, to weeds, to live stock and to profits,—are considered. Many special subjects, such as breeding field crops, exterminating noxious weeds, etc., are dealt with. Green manuring, management of farm manures, and the place of commercial fertilizers in field management in various parts of the state are discussed.

THE FARM HOUSE.

University experiment farm is conducted partly with reference to instruction. A number of students are engaged each summer to assist in the experimental work with field crops and field management, also the preservation of crops in silos and other ways. Many conveniences on the farm serve as models of their kind. A museum of a limited number of the best modern farm machines is maintained.

AGRICULTURAL CHEMISTRY.

The first term is devoted to the study of the general principles of the science of chemistry, particular attention being given to those elements and compounds which are the food of plants and animals. The work is illus-

trated by the many chemical changes which take place on the farm. The student spends a part of his time in the laboratory performing experiments relating to the subjects which are studied in the class-room.

In the second term the chemistry of farm products is begun. The composition of human and animal food stuffs forms an important part of this term's work. The chemical changes which take place during the growth of crops are studied, as well as the various factors which influence the food value of agricultural products. During this term one period each day is given to a class-room exercise, and one period is given to laboratory work. In the laboratory the student separates the various compounds of which food stuffs are composed, and he also studies the various types of food materials.

THE BARN

One term is given to the chemistry of soils and fertilizers. The requirements of the various farm crops in the way of food and the best ways of satisfying these demands are considered. The various forms of plant food which exist in the soil, the chemical changes which the plant food undergoes, and the power of crops to make use of the various compounds of the soil, form important parts of this work. In the study of soils and fertilizers, it is the aim to study the principles which govern the maintenance of the fertility of the soil.

In the chemistry of dairying, instruction is given in the chemical and allied changes which take place in the handling of milk and in its manufacture into butter and cheese.

ALGEBRA.

Algebra is required during the first term of the second year. This work covers Wentworth's Elements to highest common factor. Special attention is given to literal notation, negative numbers, the equation and factoring.

The work in the additional fourth year covers Wentworth's Elements to logarithms.

ANIMAL INDUSTRY.

The talks on animal industry are most practical. The characteristics of the leading pedigreed breeds that have special adaptation to northwestern conditions are discussed. The points of good and inferior animals in beef, cattle, sheep and swine are so taught that the student may learn to choose wisely when selecting foundation animals from which to breed or animals to prepare for the block. The fundamental principles that govern breeding are pointed out in the simplest manner possible. The feeding of animals is discussed. Special prominence is given to the choice of foods for live stock at the different stages of their development and to the preparation of the same for breeding. The general principles which relate to the care and management of cattle, sheep and swine are made clear. And as far as practicable these talks are illustrated by the presence of living specimens of the various animals under discussion.

ARITHMETIC.

Students entering the preparatory class in arithmetic are required to understand arithmetic through fractions, both common and decimal. The course gives special attention to denominate numbers, percentage in its various forms, interest, discount, evolution and mensuration. The aim is to secure both accuracy and facility in the most practical operations.

BLACKSMITHING.

The students are instructed in the management of the forge and fire, and in bending, shaping and welding iron and steel. They are required to make links, rings, hooks, bolts, clevises, whiffletree-irons, tongs, cold-chisels, punches; in short, to become familiar with all the operations necessary to enable them to do their own repair work when they return to the farm. Particular attention is given to rapid and accurate welding and to the shaping and tempering of steel tools. The forges used are such as any farmer can make for himself, and each student is taught to make his own tools, so that he will be able to furnish his shop with very little outlay.

BOTANY.

This subject is taught with special reference to its bearing upon the every-day problems that present themselves to the farmer and gardener. It is profusely illustrated with flowers and plants from the greenhouse and nursery. Some instruction is given in the use of the compound microscope.

Students are thus enabled to study intelligently, in an elementary way, the tissues of plants. By this means they get a clear idea of the general principles of plant structure and vegetable physiology.

CARPENTRY.

Instruction is given by means of text-books, lectures, and work in the shop and drawing room in the care and use of tools, including setting and filing saws, filing bits, grinding plane irons, chisels and other tools; also in laying out work and framing buildings. Methods of construction are illustrated by models and drawings. Various articles for use about the farm are manufactured by the students.

The Drill Hall.

CIVICS.

During the last term of the course students receive instruction in this science, and graduate with a good understanding of the origin, necessity, nature, and various forms of government, and the machinery employed to carry on public works, establish justice, and provide for the common defense; of the organization and management of local institutions, the town, the village, the city, and the county; the manner in which states are created and their affairs administered; the three departments,—legislative, judicial and executive, and the functions of each; the interdependence of the state and its citizens, as well as the powers and obligations of each, by due attention to which the state may be strengthened and the condition of its citizens ameliorated.

The relation of the state to the general government; the constitution, and the powers it confers; and the provisions for amendments,—are taught. The more important principles of commercial law, including contracts, agency, partnership, corporations, and commercial paper, receive attention. Instruction is also given in the United States method of surveying public lands.

COOKING.

The course in cooking extends through five terms of the curriculum as given below, with the subjects covered in each term.

Second term, C year—Kitchen management; care of cooking utensils, glass, china and silverware; measuring and invoicing; cooking vegetables, cereals and breads.

First term, B year—Canning, preserving, pickling and jelly making; soups, eggs and meats.

Second term, B year—Marketing, care of foods, and cold storage; fruits, salads, hashes, croquettes, "save all" dishes and lunch baskets; equipment of dining room and table service.

First Term, A year—Mixed soups, desserts of various fruits harmoniously combined; proper combination of flavors and colors in garnishing food; mixing and seasoning foods; carving and serving meats.

Second term, A year—Food rations; dietaries and bills of fare; invalid cooking; beverages, frozen dishes, pastry and cake; food economics; table duties of host and hostess and essays on housekeeping.

DAIRY HUSBANDRY.

Dairy Stock—During the last month of the first term students receive instruction in regard to characteristics of the various breeds of dairy cattle, their origin and comparative adaptability for the dairy. During the last term instruction is given in breeding, rearing, feeding and handling dairy stock, with practice work in judging stock and formulating rations.

Farm Dairying—During the first term a course of lectures is given in farm dairying, giving instruction in the care of milk and utensils, explaining the principles involved in creaming milk by the gravity and centrifugal processes and giving full instruction in regard to running farm separators and the manufacture of butter and cheese in the farm dairy. Students also receive practical training in the most advanced methods of creaming milk, ripening cream, churning, working and packing butter and measuring the value of milk by the Babcock test and lactometer. This practice work begins the third week of the first term and continues through the school year.

DOMESTIC CHEMISTRY.

In domestic chemistry instruction is given in the chemistry and economy of human foods. Simple tests for the detection of the adulteration of foods are given. The chemistry of cleaning material and the composition of various household articles are considered. The instruction is given in the form of laboratory practice.

DRAWING.

The student is taught the practical value of drawing for the purpose of designing and arranging buildings, machinery, etc. He makes drawings of the shop exercises then works from his own drawings, thereby learning the application.

Designs are made for dwellings, barns, out-buildings, and machinery. As practical subjects for their designs students are requested to bring from home data for plans of buildings needed on their farms. Estimates are made of the amount of material required and cost of construction.

DRESSING AND CURING MEATS.

Instruction is given in a course of lectures and demonstrations.

Two weeks' practice work in dressing, curing, and cutting up beef, pork, mutton, veal, and poultry is required of each student before graduation.

ENGLISH.

The work in English is designed to afford an elementary but thorough training in the use of English in both its written and spoken forms. Students who are unable to secure in their home schools a satisfactory course in the elements of English grammar are required to spend three to six months, according to previous preparation, in a review of this subject. Some time is devoted to the sounds of letters as indicated by their markings; words are assigned for study; attention is given to the meaning of prefixes, suffixes and root syllables; and practice is had in letter writing.

Among the topics considered in this course are: Marks of punctuation; common errors in English; the study of a few of the more common figures of speech; practice in the construction of idiomatic sentences, with a view to securing clearness, unity, strength and harmony; and weekly practice in composition writing upon assigned themes. These exercises are criticised and returned for copying.

The work in composition is supplemented by a critical study of some English classic which affords to students a model of correct English style.

In each term the second year students write an essay of about five hundred words, generally upon some practical topic dealing with farm life. The essays are likewise submitted for criticism, corrected and rewritten.

Daily practice is given in composition on topics with which the students are familiar.

ENTOMOLOGY.

The class in entomology receives instruction of a practical nature. The course is divided as follows:

Classification of insects sufficient to enable the student to distinguish between useful and injurious insects and to apply remedies intelligently, as the remedies must be selected according to the kind of insect to be combated.

Insecticides and their application; the most approved methods of using arsenical poisons, kerosene emulsions, and other preparations,—are taught

Natural remedies and nature's methods of preventing increase of injurious insects receive due attention so as to enable the student to apply their teachings. The relation of other animals to insects is also taught, so that the student may know both his friends and his foes. Special attention is given to injurious and useful insects of Minnesota.

GEOMETRY.

Geometry is offered in the second term of the third year, as an elective in place of civics to those who wish to prepare for a college course. This work covers the first two books of Wentworth's Plane Geometry.

The work in the additional year covers Wentworth's Plane and Solid Geometry.

HANDLING GRAIN AND MACHINERY.

During the fall term of the third year a course of lectures on the use and selection of farm machinery is given and the principles governing the proper methods of shocking and stacking grain are taught by means of demonstrations and practice work.

HOME ECONOMY.

This work is taught as the just proportion between income and expenditure; the distinction of economy, frugality, and parsimony is considered with reference to a definite proportion in the expenditures which are made for existence, comfort, culture, and philanthrophy. A study is made of the sources of income, especially of the income from the farm in the form of house, food and luxuries. The purchase of clothing, household stores and furnishings is considered from the standpoint of the suitable. The relation of cash and credit to cost is also considered. Attention is given to savings and forms of investment, a bank account and the use of a check book. Each student in this class is required to submit at the close of the term a paper setting forth in detail the use of a certain named income for one year, embracing not only every item of necessary home expense but also an outlay made for travel, luxuries, accident, sickness and other emergencies. The habit of keeping a household account is calculated to strengthen the judgment in making a wise use of money. Therefore an analysis and study of expenditures as here indicated serves to bring clearly before the student's mind the relative importance of the different things which money will procure.

HOME MANAGEMENT.

This includes both housekeeping and home making, and the teaching of the subject naturally falls into three divisions, household work, sanitation and family life. The instruction is based upon the belief that housekeeping is as important as it is difficult, and that home making is the noblest form of human endeavor. The points in detail in the preparation of food, the making of clothing, the care of the house and household belongings, and the ordering of the family life are considered in their relation to an adequate

plan for home management. To start the student in the correct way of becoming mistress of the business of housekeeping is the end sought. It is believed that for one who knows the reason for the doing there is no drudgery. Therefore students are taught the specific danger that lurks in dust and dirt, in order that they may understand the dignity of the unceasing war which the housekeeper makes upon these forces. The practical benefit to be derived from the knowledge students have gained in the cooking, sewing, laundering and dairy classes is emphasized and shown it its relation to an adequate plan for the daily program for the home. While the science of family life has not been formulated, yet some of its fundamental principles are recognized and may be taught.

HORTICULTURE AND FORESTRY.

Fruit growing is taught with reference to raising fruit for market.

Vegetable gardening embraces the study of garden tillage, irrigation, and rotation of crops; transplanting; formation and care of hotbeds; study of garden insects; and the growing of various vegetable crops.

DAIRY BUILDING.

Plant propagation—In this subject the principles underlying the development of cultivated varieties of plants and seed testing are taught; also the propagation of plants by seed, cuttings, grafting, and budding.

Forestry includes the consideration of the formation and care of wind breaks and shelter belts; the laying out and planting of home grounds; discussion of the hardiness, habits, and value of our native and introduced trees; and the methods of propagating them.

The work of the class room is illustrated by the orchards, nurseries, forest plantations, gardens and greenhouses on the grounds of the experiment station and by visits to commercial nurseries and greenhouses near by.

HOUSEHOLD ART.

This is taught by a series of lectures treating of the adornment of the house and grounds, noting the distinctive character of the country home, and opportunity for embellishment found in the surroundings. The intention is to show that thought and energy can accomplish as much or more than money in making a farm home attractive; also to show the importance of acquiring correct knowledge and correct taste in order to secure every possible convenience, combined with harmonious forms, colors and styles in walls, draperies, and furniture. The true relation of beauty, use and influence of surroundings upon life and character are considered in connection with the possibities for improvement that may be found in simple and inexpensive methods.

HYGIENE.

Hygiene as a special study for women considers the health of the family as dependent upon pure food, pure water, personal cleanliness and proper habits, as well as upon heredity. The aim is to show how a correct knowledge of the laws of nature is essential not only to the preservation, but to the restoration of health.

Several lectures by a physician will be given upon maidenhood, maternity, motherhood, infancy, and related subjects. These special lectures will be supplemented by the regular lectures in class, thus extending and simplifying the subjects in plain and easily understood terms.

LAUNDERING.

In the first term of C year several lectures are given and practice work is provided in washing, ironing, starching, polishing, cleaning and pressing clothing.

MUSIC AND PHYSICAL CULTURE.

Classes in music will be organized for students desiring training in these branches.

PENMANSHIP AND ACCOUNTS.

In this department the student is taught to write a plain hand with rapidity and ease. The work in accounts is applied to the transactions which the student meets in the various duties on the farm. He is so taught to keep his accounts that he may know at any time the profit or loss of any department of his business, and is thus enabled to plan intelligently.

Attention is given to the different kinds of negotiable paper; the various forms of endorsements and their effect; business forms and correspondence. Everything is made plain and practical, and students can learn to keep accurately and neatly the accounts of an ordinary business.

PHYSICAL CULTURE.

The work in this department is particularly directed to the improvement of nutrition and the correction of faulty habits of carriage and posture,

frequently the result of exercise taken in the performance of household tasks which have a tendency to produce overdevelopment of certain muscles, while leaving others almost unused. The course of study includes free gymnastics and the use of light apparatus, supplemented by movements taken from the Delsarte system of expression.

There are two classes, one for elementary and the other for advanced work.

PHYSICS.

The general principles of the science are taught, special stress being laid upon those which to the greatest extent enter into the business of the farmer. About half the time is devoted to experimental work, which includes capillarity of soil; diffusion and osmosis of gases and liquids; heating, lighting, and ventilation; farm machinery in particular, pumps, eveners,—especially three and four horse—pulleys, milk-testers, centrifugals, incubators, wind-mills, steam and gasoline engines; friction and lubricants; tensile strength of wire and binding twine of different grades; lightning and lightning protection. The foregoing indicates the character of the work, the attempt being to give the student an acquaintance with the laws of nature that he may act with reason and work to advantage.

PHYSIOLOGY.

During the first year students take one term of applied physiology. This is an effort to connect technical physiology with the necessities of every day life. The work includes a study of the general plan and structure of the body and the various individual tissues of which it is composed; also sources of heat and energy, digestion, and the relation of food materials to the various tissues of the body. Considerable attention is given to diseased and innutritious foods, food adulterations and narcotics. The circulation is studied with especial reference to the relation of the blood and lymph to tissue nutrition and tissue waste.

Accidents, including poisoning, are studied for the purpose of giving a practical knowledge of what to do in emergencies. Considerable attention is given to the subject of clothing, the various materials in use being considered with reference to fitness for special purposes. Some time is also given to the study of common physiology, of the organs of circulation, digestion, respiration, nervous system, and the relation of bacteria to the common diseases, especially such diseases as consumption, typhoid fever, etc. A brief study is also given to the subject of digestion in the lower animals.

The class work is illustrated by means of large charts, skeletons, manikins and dissections. Important points of difference between human and animal physiology are pointed out in preparation for the third year's work in the veterinary class. Matters of home and personal hygiene are interwoven with the physiology work.

POULTRY.

In the instruction in this subject the following will be considered: history and characteristics of the leading breeds of poultry; breeding, feeding, and management of fowls for eggs and for the market; planning, building, and arrangement of poultry houses; managing incubators and brooders. A model poultry house, containing pens of the most improved breeds, incubator cellar, workroom, etc., has been provided, where experimental work and practical instruction are carried on.

SEWING.

The course in sewing consists of five terms' work. During the first term the student receives instruction in the elements of sewing, including different stitches, seams, hems, darning, etc., also practical talks on the use and care of all the implements belonging to the sewing basket. The second years' work consists of cutting and making plain garments, drafting of underwear, children's clothing, shirt waists and cotton dresses, taught by a very simple method, using only the tape line and square.

The third year the more difficult work of dressmaking is taken up; cutting and fitting of dresses and jackets. Careful attention is given to selection of materials and to the harmony of color.

The course is designed to make each graduate capable of doing all kinds of sewing required in the home.

SOCIAL CULTURE.

A course of lectures is given on the usages of good society, including manners, behavior, the voice, conversation, forms of address, invitations, etc. Attention is directed to the fact that all approved etiquette rests upon the great law of kindness. The importance is shown of personal fitness for society through attention to the laws of health and to personal habits, as well as through the refinement of a cultivated mind and sympathetic spirit. Suggestions are made in reference to reading, literary taste and the choice of books. Especial stress is put on the thought that the family life ought to be the highest expression of good society, and therefore the manners and conversation in the home should be the very best of which one is capable. Next in importance to the power of thinking correctly is the power of approaching others with ease and speaking with tactful directness, and consequently any study or practice intended to cultivate the social nature deserves earnest attention. Some instruction is given in the elementary principles of parliamentary usage.

VETERINARY SCIENCE.

During the A year the students take up a course of study in veterinary medicine, the purpose of which is to fit them for intelligent care of their farm stock. In this course the teaching is done by means of lectures, dis-

tribution of mimeographed lecture notes after each lecture, reviews and clinical work at the hospital, maintained for this purpose. Lectures are illustrated by means of charts, manikin of horse, skeleton of horse, and various other appliances.

The lecture consists of a series on each of the following subjects: Elementary anatomy; elementary pathology; cause and prevention of diseases; diagnosis and treatment of common diseases, examination for soundness; and a final short course on common medicines, studying their effects, uses and doses. At the hospital clinics students are enabled to examine and care for a variety of cases and to learn the elements of diagnosis for the more common diseases and forms of lameness.

ZOOLOGY.

Chiefly Minnesota animals are considered: (1) their classification; (2) their habits and food; (3) their relation to the farmer. To assist the students in their work, a museum has been started in which is shown the relation of Minnesota animals, birds, reptiles, etc., to agriculture. Soils, minerals, fossils, plants—both useful and injurious—are also on exhibition.

CLASSIFICATION OF STUDENTS.

No student with incomplete C or preparatory work will be classified as an A.

No student with incomplete preparatory work will be classified as a B.

No student with incomplete C or preparatory work will be made a commissioned military officer.

SPECIAL COURSE.

Persons of mature age will be admitted to a special lecture course during the ten weeks of the winter term, as indicated in the daily program for special students. A fee of ten dollars will be charged for this course, and special students will not be admitted to the boarding department.

The following subjects will be discussed: Agriculture—Soils; fields; growing, harvesting and preserving forage and grain crops; farm development and farm management. Dairy Husbandry—Feeding and judging dairy stock. Animal Husbandry—Breeding, feeding and judging beef cattle, sheep and swine. Chemistry—The composition and value of foods and the conservation of soil fertility. Farm Machinery—Covering farm motive power, as engines, wind mills and pumps and farm implements. Cutting and curing meat—How to cut up and cure the various kinds of meat, and how to select and name the different parts. Farm Horticulture—Lectures on the cultivation of the apple, plum and small fruits, on vegetable gardening, and on wind breaks and ornamental trees. Veterinary—A discussion of the most common diseases of farm animals and how to care for them. Entomology—Common and noxious insects. Poultry—Care and breeding of domestic fowls.

The following program of studies shows the days of the week and the hours on which each teacher lectures:

DAILY PROGRAM FOR SPECIAL STUDENTS.

	8:15-9:00.	9:05-9:50.	9:55-10:40.	10:45-11:30.
Boss, A	*5	5	.....	.....
Boss, W	.....	3, 4	2, 3	.....
Drew	.....	.....	1, 5	.....
Green	2	.....	.....	.....
Haecker	4	2	.....	.....
Hays	.....	.....	4	3, 5
Lugger	3	.....	.....	.....
Reynolds	.....	1	.....	.....
Shaw	.....	.....	.....	1, 2, 4
Snyder	1	.....	.....	.....

*Each figure under the hours represents ten lessons and shows the day of the week, 1 meaning Tuesday, 2 Wednesday, etc.

THE FARM STUDENTS' REVIEW.

The Alumni Association of the School of Agriculture is publishing an agricultural paper, the Farm Students' Review, which is now in its fifth year. This is proving a most important agency in the development of the department and of agriculture in Minnesota.

Dairy School.

THE FACULTY.

CYRUS NORTHROP, LL. D., *President.*
WILLIAM M. LIGGETT, *Dean.*
T. L. HAECKER, *Professor of Dairy Husbandry, in charge of School.*
HARRY SNYDER, B. S., *Dairy Chemistry.*
OTTO LUGGER, Ph. D., *Bacteria in Dairy Products.*
W. M. HAYS, M. Agr., *Forage and Pastures.*
M. H. REYNOLDS, M. D., V. M., *Diseases of the Dairy Cow.*
J. A. VYE, *Creamery Records and Accounts.*
WM. ROBERTSON, B. S., *Care of Boiler and Engine.*
C. R. ALDRICH, *Dairy Buildings.*
J. M. DREW, *Silo and Stable Conveniences.*
B. D. WHITE, *Instructor in Butter Making.*
A. J. GLOVER, *Instructor in Cheese Making.*
WM. BOSS, *Instructor in Practical Engineering.*
H. L. SONDERGAARD, *Assistant Instructor in Butter Making.*
JACOB LEHNHERR, *Instructor in Sweet Curd Cheese Work.*

The next session of the Dairy School will begin January 2, 1901, and continue four weeks.

This course is designed to furnish persons who are actually engaged in the manufacture of butter and cheese, or who purpose to take up this work, an opportunity to become more skilled in their work, and also to study the many problems which have a direct bearing upon the dairy industry. Recognizing the fact that such persons cannot be away from business for a long period, the term has been so arranged that the time of each student is fully occupied by lectures and actual work every hour of every working day of the term.

The rapid growth of the dairy industry in the Northwest calls for a corresponding enlargement of the work in dairy instruction. To meet this want the dairy hall has been more than doubled in capacity and equipped with all apparatus necessary to give instruction in the various lines of dairy work.

No pains will be spared to maintain the high standard which the school has attained. Each member of the faculty has special qualifications for the duties to which he has been assigned. The lecture course and practical instruction are arranged with special reference to giving the greatest amount of training and practice possible in a four-weeks session. Large additions have been made to the equipment of the dairy hall in both butter and cheese departments; in fact, it has everything needed for conducting the work by the most approved methods.

Instruction is divided into six courses:

1st. Lectures covering the entire field of dairy husbandry.
2d. Practical work daily in the butter room.
3d. Practical work daily in the cheese room, where the manufacture of flats, cheddars, Swiss, brick, Edam, and Gouda cheese will be carried on.
4th. Practice work in the laboratory examining milk, making daily composite tests, and the pasteurization of milk and cream.
5th. Practical engineering, steam-fitting and plumbing.
6th. Practical work in factory bookkeeping.

I.—LECTURES.

The course of sixty lectures furnishes in a plain and concise form the most valuable information for those who are interested in any branch of agriculture, covering, as it does, the most important points in the breeding, rearing, feeding and general management of dairy stock, the economical production of milk, growing and preserving of forage and grain crops, the management of meadows and pastures, management of barns, stables and yards, construction of silos, co-operative dairying, creamery and cheese factory management, judging and marketing dairy products, the chemistry of milk, dairy bacteriology, engineering, animal hygiene and treatment of the common diseases of the dairy cow.

II.—BUTTER MAKING.

The running of separators; ripening and churning of cream; the proper acidity of cream to secure best flavor; how to churn, wash and salt butter so as to avoid specks and mottles; to secure good grain and best methods of preparing for market—are some of the points which receive special attention. As all creamery men should be able to judge butter from a commercial standpoint, students are trained daily in the art of scoring butter by the score-card.

III.—CHEESE MAKING.

The work in the cheese room is conducted on a large scale, including the manufacture of several brands of fancy cheese. The fact that there is a demand for these at highly remunerative prices has induced the Regents to provide the necessary means for carrying on this work.

A complete record of every step taken is required of each student. Here is a good opportunity for cheese makers to meet, investigate new methods, make experiments on doubtful points, compare notes, and thus gather in a few weeks knowledge that otherwise would take years to acquire.

IV.—MILK TESTING.

The recent invention of the milk test has revolutionized the methods of declaring dividends in co-operative dairying. It has been found that the value of milk for both butter and cheese is measured by the per cent. of fat content, and nearly all factories and creameries now pay on the "relative

value" plan. It is therefore necessary for every factoryman to familiarize himself with the best methods of milk testing. The chemist gives a general outline of the work, but in order that each student may have practice in milk testing, daily exercise is given. Steam, turbine and hand power machines and other apparatus are provided and operated in the laboratory.

The pure and wholesome milk and cream supply for our cities is a matter of vital importance, and there is great need for improved methods of handling milk intended for this purpose. To meet this, a milk and cream pasteurizing apparatus has been manufactured specially for our dairy school, and a few advanced students will be given instruction in the process.

V.—MOTIVE POWER.

The work in engineering consists of practical talks on the construction, care and management of creamery engines and boilers, pumps, injectors, heaters, etc., and work in the practice room.

In the practice room is provided an eight horse power simple, slide-valve engine, three types of boiler feed pump, two types of deep well pumps, one injector, two milk pumps, and a steam gauge, which the students have the privilege of examining and operating. Instruction is also given in pipe fitting, placing shafting, babbitting bearings, soldering, etc.

It is the aim to make this work as practical as possible. Questions of interest on the subject are freely discussed.

VI.—FACTORY BOOKKEEPING.

All the essential features of factory accounting from the receipt of the milk to the returns in net proceeds are thoroughly considered. Paying for the milk according to the fat content, or otherwise, is fully explained. The students do, in books provided, the actual one month's accounting of a creamery.

REQUIRMENTS FOR ADMISSION.

Experience has shown that students who have had some practical training in the creamery or cheese factory before coming to the dairy school are, as a rule, the ones who are able to make the most of the course; it is therefore required that persons who intend to take this course shall have had at least one season's experience before coming to the school. No entrance examination is required.

EXPENSE.

A registration fee of $15 is required of each student. Students can board in either city and reach the school by street car, or board can be secured near the school for from $3.50 to $4.00 per week. Each student is required to supply himself with two white suits, including caps, to be worn during working hours in the creamery and cheese rooms. The suits may be procured for about $1 each.

DAIRY CERTIFICATES.

The Regents will grant dairy certificates to students who have taken the course and passed a satisfactory examination and in addition have demonstrated by one year's work in a factory that they are skilled in the art of butter or cheese making, and are thoroughly qualified to take charge of a creamery or cheese factory.

To reach the school from either St. Paul or Minneapolis take the Como Interurban Harriet street car and get off at Dooley avenue.

Address applications for admission to T. L. Haecker, St. Anthony Park, Minn.

The Agricultural Experiment Station.

OFFICERS OF THE STATION.

WM. M. LIGGETT, *Director.*
WILLET M. HAYS, M. Agr., *Agriculturist.*
SAMUEL B. GREEN, B. S., *Horticulturist.*
OTTO LUGGER, PH. D., *Entomologist and Botanist.*
HARRY SNYDER, B. S., *Chemist.*
T. L. HAECKER, *Dairy Husbandry.*
M. H. REYNOLDS, M. D., V. M., *Veterinarian.*
THOS. SHAW, *Animal Industry.*
ANDREW BOSS, *Assistant in Agriculture, University Farm.*
T. A. HOVERSTAD, B. AGR., *Superintendent sub-station, Crookston.*
R. S. MACKINTOSH, *Assistant in Horticulture, University Farm.*
HERMAN H. CHAPMAN, B. S., *Superintendent sub-station, Grand Rapids.*
E. W. MAJOR, B. AGR., *Assistant in Dairy Husbandry.*
J. A. VYE, *Secretary.*

The purpose of the Agricultural Experiment Station of the University of Minnesota is to bring home to the farmers of this state the importance of the practical application of agricultural science and to discover facts and processes that will be of permanent value to the rural husbandry of Minnesota. This station was established in 1887, under an act of congress appropriating funds for experimental work in each state, and since then has published 67 general and 10 press bulletins that embrace a wide range of agricultural subjects included under the heads of dairying, animal husbandry, entomology, botany, horticulture, forestry, chemistry and general agriculture. These bulletins are issued for gratuitous distribution to the citizens of this state, and of each general bulletin sixteen thousand copies are printed. The station is located at University Farm, St. Anthony Park, Minn. Most of its officers are also employed in the school and college of agriculture. Its equipment consists of 250 acres of land, embracing a variety of soils and exposures; a large general purpose and stock barn; a good sheep barn; piggery, and hennery; a collection of various breeds and kinds of animals; nurseries; forest and small fruit plantations; orchards; gardens; greenhouses; and museum. The offices, laboratories and work rooms of the school of agriculture are also used for the work of the experiment station, which has become widely and favorably known in this and other states. Several of the railroads in the state make a point of encouraging the farmers along their lines in visiting the station by giving reduced rates for this purpose. The work at University Farm is supplemented by the sub-station located at

Grand Rapids, on land that is characteristic of the northeastern part of the state, and by the sub-station located at Crookston, on land that represents the soil of the Red River Valley. Each of these farms is equipped with buildings and machinery and is in charge of a competent superintendent. Experiments are also carried on at the farm of Supt. O. C. Greeg, in Lyon county (Coteau Farm), which is typical of the agricultural lands of that section.

PUBLICATIONS OF THE AGRICULTURAL DEPARTMENT.

BULLETINS OF THE EXPERIMENT STATION FOR 1899.

Bulletin 62—Wheat. Varieties, Breeding, Cultivation.

Bulletin 63—Miscellaneous Analyses. Composition of Tomatoes. Proteids of Wheat Flour.

Bulletin 64—The Black Rust or Summer Rust. The Hessian Fly. Migratory Locusts or Grasshoppers.

Bulletin 65—Soil Investigations. 1—The Chemical Composition of Soils. 2—The Mechanical Composition of Soils. 3—The Available Plant Food of Soils. 4—Characteristic Features of Minnesota Soils and Conservation of the Fertility of the Soil.

Bulletin 66—Beetles Injurious to Fruit Producing Plants.

Bulletin 67—1—Investigation in Milk Production. 2—Feeding Dairy Cows.

STUDENTS.

COLLEGE OF AGRICULTURE

SENIOR CLASS—7.

Clark, Robert Wallace, Auburn, Ala.
Glover, Arthur James, Zumbrota.
Houlton, Sam Randolph, Elk River.
Palmer, William Carl, Somerset, Wis.
Scofield, Carl Schurz, Bloomington.
Wheeler, William Archie, Winnebago Valley.
Wilson, James Alexander, Lake City.

JUNIOR CLASS—6.

Aune, Beyer, Starbuck.
Bull, Coates P., Edina Mills.
Mackintosh, Roger Sherman, Langdon.
Riley, Edward Henry, Hammond.
Tasa, Helge Ludwig, Holden.
Washburn, Robert Mann, Monticello.

SOPHOMORE CLASS—3.

Buell, Max Whitney, St. Anthomy Park.
Ryder, Frank James, Buffalo.
Thompson, Mortimer Lee, LaCrosse, Wis.

FRESHMAN CLASS—7.

Becksted, Jesse Franklin, St. Anthony Park.
Finseth, K. Olaus, Kenyon.
Gaumnitz, Daniel Asher, St. Cloud.
Guthrie, Francis Burrell, St. Anthony Park.
Hoyt, Ben Terril, St. Paul.
Krum, Henry Garfield, Minneapolis.
Widmoyer, Leslie R., Dresbach.

SCHOOL OF AGRICULTURE.

GRADUATE STUDENTS—2.

Craig, George, St. Anthony Park.
Lugger, Humboldt, St. Anthony Park.

A CLASS—45.

Aiton, John William, St. Peter.
Anderson, Arthur Henry, Rowland.
Anderson, Theodore Alvin, Rush City.
Andrews, Lewis Frederick, Green Valley.
Boss, Alexander, Zumbro Falls.
Boutwell, Edwin Elijah, Kasota.
Brewster, John Ranney, New Lisbon, Wis.
Briggs, Ealy Grannis, Houston.
Busian, Gerhard Lud, Dover.
Cady, Le Roy, Buffalo.
Carter, Edward, Austin.
Cuzner, Harold, Minneapolis.
Dean, George Edward, Bloomington.
Firmin, Alfred Fouracre, Minneapolis.
Gronewald, Arthur John, Faribault.
Hoagland, Ralph, Wayzata.
Hodnett, Royal William, Stillwater.
Johnson, Algot, Minneapolis.
King, Clarence Everett, Washington.
Liggett, Alfred Russell, Detroit, Mich.
Loughlin, John Francis, De Graff.
—Matthews, Mary Lockwood, Cambridge City, Ind.
Mueller, Adolph, Mankato.
Newdall, Axel, Springfield.
Oehler, Daniel Edwin Orlando, St. Paul.
Olson, Bennie, Corning.
Olstad, Casper, Hanska.
Peters, Theodore Adam, Thielmanton.
Pfeiffer, Albert Laurence, Olivia.
—Pratt, Celia Jane, Bethel.
Pratt, Sumner William, Bethel.
Pryor, Howard William, Glencoe.
—Robinson, Evalena Maria, Minneapolis.
—Rowe, Minnie, Hewitt.
Sandberg, Victor Alfred, Albert Lea.
Schrader, Udo Fredrich, Minneapolis.
Solem, Olai Christian Steffen, Brighton.
Snyder, Leo Harter, Herkimer, N. Y.
Thompson, James, Jr., Lanesboro.
Ueland, Justus, Edgeley, N. D.
Ward, Fred, Buffalo.
Wells, James Eugene, Monticello.
Wickstrom, Clara Louise, Oak Grove.
—Wilcox, Estelle Willa, Hugo.
Wilson, William Phillips, Lake City.

B CLASS—71.

Aaker, Olaf, Oslo.
Adams, Theodore, Luverne.
Amidon, Perry Nelson, Houston.
Anderson, Anker, Artichoke.
Armstrong, Charles Francis, Louriston.
Atz, Howard, Hancock.
Baker, Albert Ole, Kenyon.
—Biery, Elizabeth Anna, Cheney.
Boerner, Emil, Buffalo.
Boss, David, Zumbro Falls.
—Carel, Anna Cora, St Paul.
Cutting, Fred Everstine, Byron.
Danielson, George Adolph, Goodhue.
Davison, Charles Bradley, Granada.
—Denison, Mary Agnes, Faribault.
Emmans, George Martin, St. Francis.
Erickson, Edward Oscar, Minneapolis.
Evenson, Robert, Strout.
Evenson, Hans Olaf, Strout.
—Frear, Jenness Broughton.
Minnetonka Mills.
Frank, James, Warren.
—Giesmann, Elma Alice, St. Paul.
Giesmann, August Rudolph, St. Paul.
Grant, Arthur Dow, Walcott.
Hall, Lester Lewis, Morris.
Hauson, Andrew, Evan.
—Held, Ella May, St. Anthony Park.
Herbrandson, Herman, Brooten.
Holen, Edward Christian, Pelican Rapids.
Holteen, Homer Benjamin, St. Peter.
Hompe, Howard Ernest, Deer Creek.
Howland, Jesse, Northfield.
Hunt, William, Dot, Wis.
Ingalls, Benjamin, Blooming Prairie.
Jackson, Gilbert, Litchfield.
Judd, Clarence, Morris.
Kimball, Arthur Hazen, Albee, S. D.
—Laate, Gurid, Ratcliffe, Ia.
Laingen, Chester, Butternut.
Larson, Albert Gapheus, Bradford.
Leach, Ray, Excelsior.
—Leinen, Mary Agnus, Hamline.
—Lenhart, Edna, Minneapolis.
—Lind, Emma, Houston.
Lund, Henry Carl, Lansing.
McComber, George Embert, Barnum.
Mallery, Alfred Lyman, Lakeville.
McLaren, Harley Edward, Buffalo Lake.
Naegli, Herman Gustave, Elizabeth.
—Nelson, Christine Pearl, St. Anthony Park.
Newton, William Daniel, Utica.
Oberg, Edgar Theodore, Watertown.
—Palmer, Mabel, Como, Wis.
Parker, Edward Cary, St. Anthony Park.
Peterson, Peter Godfried, Hector.
Poole, Harvey Wentworth, Winnebago City.
Praught, Donald, St. Michael's Station.
Redman, Carl Wayne, Omaha, Neb.
Roberts, Henry Leslie, Cottage Grove.
Roohr, Francis Lewis, Warwick.
Sampson, Theodore Joshua, Strout.
Sanderson, Theodore, Rock Dell.
Sheldon, Horace Fuller, Paynesville.
Sheldon, Merton Luther, Paynesville.
—Strunk, Blanche Alice, Faribault.
Thompson, Edward Thomas, Christiana.
—Washburn, Lura Mabel,
St. Michael's Station.
Wickstrom, Adolph Fred, Oak Grove.
Wolner, Julius Hans, St. Anthony Park.
Woodward, George Eugene, Langdon.
Young, Ralph, William, Holloway.

C CLASS—132.

Alsaker, Edwin Richard, Benson.
Atz, Asterly, Hancock.
Austvold, Theodore Ben, Glenwood.
Ayer, Harry Darius, Lime Springs, Iowa.
Bacheller, Thomas Thaxter, St. Louis Park.
—Bassett, Lelia Adela, Rushmore.
Bentdahl, Oluf, Hanska.
Bergen, Gunarius, Sacred Heart.
Bjortson, Bennie, Hanska.
Blair, Donald, St. Anthony Park.
Boss, John, Zumbro Falls.
Boyle, William, Stillwater.
Brimmer, Archie Ely, St Anthony Park.
—Brude, Julia, Hanska.
Brudelie, Oluf, Madelia.
—Buell, Myra Whitney, St. Anthony Park.
—Buskerud, Mathilde, Carlisle.
Christenson, Bertel Peter, Hutchinson.
Christilaw, Charles Henry. Glenwood.
Clark, Harry Oscar, Eureka.
—Collins, Gertrude Valentine,
Livingston, Mont.
Cooper, Thomas Poe, Emerado, N. D.
Danielson, Howard Raymond, Goodhue.
Davis, David, Duluth.
Dean, Melburn, Bloomington.
Embertson, Oscar Fred, Grue.
Erickson, Edward Oscar, Belview.
Folsom, David Alfred, Lake Crystal.
—Fasken, Eva, Faribault.
—Ferch, Lydia, Odessa.
—Ferch, Susie, Odessa.

Fingerson, Gilbert Gorgen, Swift Falls.
Fowler, Robert Gray, Amery, Wis.
—Gilbert, Mary Emily, Louisville, Ind.
Goodhue, Ralph Bigelow, Northfield.
Goodrich, Perry Leigh, Calhoun, Mo.
Grant, Charles Francis, Windom.
Grant, George William, Windom.
Gronewald, William Frederick, Faribault.
—Guillaume, Marie Theresa,
St. Anthony Park.
Hagen, Sigrid, Elizabeth.
—Hagestande, Clara, Madelia.
Halverson, Ole Levi, Litchfield.
—Halverson, Mabel, Litchfield.
Hanson, Simon Edwin, Two Harbors.
Hayes, Morris, Minneapolis.
Hayward, John Edwin, St. Cloud.
Hayward, Leon Edison, St. Cloud.
—Held, Natalie Margaretta, Minneapolis.
—Hermes, Clara May, St. Paul.
Higbie, Clarence, Grand Meadow.
Holmberg, John Nathaniel, Renville.
Holmquist, Thomas William, Faribault.
Hummel, Edward, Dundas.
—Hummel, Lucie Amelia, St. Paul Park.
Hunt, Earl, Minneapolis.
Jepson, Frank, Richfield.
Johnson, Magnus, Atwater.
Jones, Harold, Minneapolis.
—Keller, Lizzie, St. Paul.
Kidder, Bryan Ayer, Marshall
King, Ernest Arthur, Washington.
—Koch, Mary Elizabeth, White Willow.
Larson, Henry William, Swea City, Ia.
Larsen, Alfred Gothard, Winthrop.
Lippitt, Leroy Austin, White Rock, S. D.
Ludtke, Henry Adolph, Willow Creek.
Miller, Ralph, Bloomington.
—Monson, Bessie, Pomme de Terre.
—Moshner, Ella, Lewiston, Mont.
Murphy, Harley Fred, Hamline.
Newman, Cash Haywood, Withrow.
—Ostrander, Thora, Hamline.
Payne, Claude Clark, Kasota.
—Pennington, Grace, Cottage Grove.
Pennington, Frank, Cottage Grove.
Pennington, Alfred George, Cottage Grove.
Pentz, Walter Franklin, Faribault.
Perkins, Ross, Houston.
—Philley, Marie Ida, Louisburg.
Quist, George, New Sweden.
—Ramsland, Gertie Theodora, Sacred Heart.
Ramsland, Magnus, Sacred Heart.
Randall Carl, Camden Place.
Ring, Hiram, Milaca.
Rhoads, Burton Willis, Leavells, Va.
Rittle, William, St. Paul.
Ritzinger, Frederick, Crocus Hill.
Robinson, Edward William, St. Paul.
Rose, John De Ceu, Detroit.
Sargent, Edwin William, Red Wing.
Schneider, John Walton, White Bear Lake.
—Schumaker, Clara, St. Anthony Park.
Scott, Charles, Grand Forks, N. D.
Scott, Roy, Grand Forks, N. D.
Scott, Herbert Charles, Thielman.
Seltz, William Frederick, Waconia.
Shepard, John Comstock, Smith's Falls.
Shostad, Rasmus Erik, Echo.
Simpson, Willis Arthur, Castle Rock.
Sletten, Hand Magnus, William.
Spreiter, Walter Emil, Berne.
Stanley, Henry Martin, Maine Prairie.
—Staples, Hattie, St. Paul.
—Staples, Edith Helen, St. Paul.
Stegner, Arthur William, St. Paul.
Storle, Peter Oscar, Lanesboro.
Swenson, Halvor, Lamberton.
Taylor, Glen Royal, Minneapolis.
Thomas, W. A.,
Thomas, Charles Henry, Minneapolis.
—Thomson, Amanda, Minneapolis.
Thomson, Wirt Amos, Good Thunder.
—Thoreson, Julia, Neby.
Thorpe, Edward Lawrence, Willmar.
Tilleshir, Luther, Brandon.
—Todd, Alice Mabel, St. Anthony Park.
Torbenson, Oscar, Christiana.
Tyler, Granville Albion, Minneapolis.
Tyler, Charles Shirley, Minneapolis.
Tyson, Robert Edwin, Redwood Falls.
Van Vlissinger, Paul Cornelius, Hitterdal.
—Vingi, Dagne, Dalton.
—Voxland, Clara, Norway.
—Warden, Lola Elizabeth, Maine Prairie.
Ware, John Fleming, St. Anthony Park.
Weir, James, St. Anthony Park.
—Wilcox, Jean, Hugo.
—Wilkins, Anna Loretta, Minneapolis.
—Wilson, Nettie Ray, Davies.
Wood, George Eugene, Crary, N. D.
Worthley, Ralph, Sherburne.

PREPARATORY CLASS—77.

—Aaker, Anna, Oslo.
—Abrahamson, Ellen, Houston.
Abrahamson, Elmer Oliver, Houston.
Altner, Gustav Herman, Elizabeth.
Anderson, Frank Oscar, Strout.
Anderson, Julius, Bird Island.
—Brandvold, Carrie, Dalton.
—Busse, Maud Ethel, Minneapolis,

Campion, Jesse William, Angus.
—Cedarholm, Ida Louisa, Cannon Falls.
Christopherson, Julius, Hanska.
Cosart, George Lawrence, Maine Prairie.
Dinsmoor, Fay, Austin.
Downie, Dana, Faribault.
Elofson, Andy, Litchfield.
Enestvedt, Engebert, Belview.
Fey, John Albert, Ortonville.
Halverson, Henry Levi, Litchfield.
Hanrahan, John, Glenwood.
Hatling, Lewis, Dalton.
Heier, Christian, Twin Valley.
—Heier, Carrie, Twin Valley.
—Hoagland, Myrtle May, Long Lake.
Holt, Homer Benjamin, Delhi.
Hosford, John Benjamin, Nashua.
Hosford, Charles Edward, Nashua.
Jackson, Frederick, Litchfield.
Johnshoy, Herman Magnus, Horeb.
—Johnson, Anna, Hanska.
—Johnson, Laura, St. Paul.
—Johnson, Anna, Bernadotte.
Julin, Henry, Braham.
Kjos, Martin Olaus, Arendahl.
Leet, Martin, Fosston.
Lein, Bernard, Carlisle.
—Lillehaugen, Cecelia, Oslo.
Lockwood, Henry, Grand Meadow.
Maring, Albert, Nansen.
Mandell, George Dwight, Farmington.
Matthews, Meredith, Cambridge City, Ind.
McGrath, John, Faribault.
Meyer, Joseph, Sergeant.
—Nawe, Elsie Louise, Rockford.
Nugent, Patrick James, Hegbert.
Nystrom, Emil, Strout.
—Olson, Lydia Ethel, Long Lake.
Opp, Alfred, Hegbert.
Paterson, Thomas George, St. Cloud.
Pease, Roy Ernest, Hamilton.
Plummer, Carl Berkely, Hawley.
Price, Arthur, Beaver Creek.
Reinert, Charles, Oden.
Robertson, Lynn Shelby, London.
—Rose, Maud, Detroit.
Rustad, Alvin, Dalton.
Ruud, Oscar, Dawson.
Schacht, John Bernard, Elizabeth.
Schwartz, Oscar August, Sargeant.
Sevareid, Weir Julius, Aspelund.
Schaver, Fay Robinson, Redwood Falls.
Shelley, Edward Shiver, Madelia.
—Shuman, Nellie Corrine, Excelsior.
Sinnott, Richard, St. Paul.
Stratte, Henry, Dawson.
Strom, Elvin, Thorpe.
Sundahl, Andrew, Litchfield.
Swenson, Henning H, Lamberton.
Thoe, Jacob, Oslo.
Thoe, Oscar, Oslo.
—Thoreson, Hannah, Neby.
Thoreson, Ole, Neby.
Tomhave, William Henry, Fergus Falls.
Von Wald, Arthur Lorenz, Nerstrand.
Wasson, Harris Berton, Bellevue.
Weihe, Lewis, Arlington.
Wheeler, George Austin, Terrace.
—Wilzbacher, Louise Rose, Hamline.

SPECIALS—80.

Anderson, Andrew, Walbo.
Anderson, August Richard, Amor.
Anderson, Martinus Gabriel, Cottonwood.
Aveldson, August, Manannah.
Bacon, Elbridge, Minneapolis.
Berg, Hans, Cottonwood.
Bunge, Albert Christian, Eitzen.
Butt, John Henry, Tenney.
Carlson, Axel, Swift Falls.
Carlson, Joseph, Pilot Mound.
—Clark, Mrs. Roy R., St. Anthony Park.
Clothier, George Lemmon, Manhattan, Kan.
—Cosgrove, Cora Beth, Le Sueur.
Daley, John James, Hancock.
Davidson, Isaac, Emmons.
Distad, Ole Erick, Skjold, S. D.
Dockstader, Thomas, Wrightstown.
Dokken, Albert Oliver, Swift Falls.
Dokken, Edward, Swift Falls.
Doten, Harold, Brooklyn Center.
Eliason, Emil, Cottonwood.
Fjelstad, Theodore, Madelia.
Frydenlund, Carl, Madelia.
Gadbois, Emile Joseph, Minneapolis.
—Grant, Fanny, Omaha, Neb.
—Graves, Blanche, St. Paul.
Greeley, Ronda Blair, Gary, S. D
Gunderson, Elias, Bryant, S. D.
Gutterson, Andrew, Arendahl.
Hagestande, Hansine, Madelia.
Hallan, Ole Olson, Underwood.
Harstad, Anton, Arendahl.
—Hegseth, Mollie, Carlisle.
Hiddebrandt, William, Morris.
Holden, Halvor, Sunburgh.
Husting, Peter.
Jackson, John, Grand Forks, N. D.
Johnson, Andrew, Saude
Johnson, William Henry, Hallock.
Johnson, Oscar, Hallock.

Johnson, Carl, Cottonwood.
Kaiser, Henry, Garnavillo, Iowa.
Kassube, Frederick, Hamil.
Kjoerness, Carl, Minneota.
Kvale, Peter, Emmons.
Kusske, Adolph, Rush River.
Larson, Arvid, Red Wing.
Larson, Alfred, Grove City.
—Lay, Florence, Minneapolis.
Lindberg, Charles Emil, Vasa.
Linn, Nels, Manannah.
Malmsen, Franklin, Vasa.
Matson, Ole, Crookston.
McNamara, Joseph, Graceville.
Murray, Ray, Bird Island.
Neugebauer, Peter, New Richland.
Orsen, Nicholai, Minneota.
Parker, Edward Stewart, Coatopo, Ala.
Quale, Ove, Swift Falls.
Quie, Thomas, Sunburgh.
Rengel, Joseph, Pierz.
—Rhodes, Sarah Elizabeth, Clarence Center, N. Y.
Rodberg, Simon, Benson.
—Rustad, Mary, Fergus Falls.
Sargeant, Waverly Burdette, Red Wing.
Satre, Knute, Frost.
Setterlund, Albert, Wheaton.
Sjaquist, John, Dwight.
Smithwick, Michael Joseph, Graceville.
Snow, Orson Hilbert, Beaver Creek.
Stenerson, Ole, Swift Falls.
Sullivan, Dennis, Rosemount.
Sundley, Carl, Underwood.
—Tew, Marie, Wahpeton, N. D.
Thoreson, William, Brandon.
Titrud, Victor, Stockholm.
Underdahl, John, Revere.
Underdahl, Gunder, Moland.
Utigard, Peter, Melville.

DAIRY SCHOOL CLASS—73.

Andrews, L. F., Green Valley.
Arneson, Herman F., East Union.
Backmark, Harry, Atlas.
Ballou, N. N., Littleton, Iowa.
Bennke, Ernest, Minneapolis.
Brandt, Christian A., Mahtowa.
Bueche, L. A., Carver.
Carswell, Allan, Duelm.
Christison, Chester J., Owatonna.
Christianson, Peter E., Owatonna.
Cohrs, Albert A., Dovray.
Dals, John, Helena.
Dillree, E. A., Faribault.
Dyberick, I. O., Blue Earth City.
Elis, C. M., Skyberg.
Fane, Lewis, St. Michaels.
Fischer, Rudolph, Wells.
Flatt, J. H., Glenville.
Fraser, Robert A., Austin.
Fritz, H. C., St. Paul Park.
Fritze, Henry, Sumpter.
Goplen, Albert A., Roscoe.
Groth, Anton C., St. Ansgar, Iowa.
Hagberg, O. A., Stanton.
Hansen, Charles S., Constance.
Hansen, Henry, Constance.
Hed, Edwin, Bernadotte.
Hibbard, A. L., Roscoe.
Hoinm, O. F., Lerdal.
Jennings, George, Waverly.
Johnson, Herman, Cannon Falls.
Jordahl, Jens O., Manchester.
Lovase, Iver, Palmer, Wis.
Leathers, Wm. C., Oak Grove.
Loke, Wm. C., Richland.
Meisner, Herman, Arlington.
Milso, Fred J., Minnesota Lake.
Minderman, Cort, Sauk Rapids.
Mortenson, M. P., Cokato.
Nagel, H. G., Twin Lakes.
Nelles, P. C., Rogers.
Nelson, N. E., Stanton.
Newcomb, E. L., Sumter.
Norman, Erick, Cambridge.
Olsen, Ben, Willmar.
Olsen, Fred, Alstad, Wis.
Oveland, Iver, Twin Valley.
Palmer, Carl C., Brooten.
Paulson, Elmer A., Grove City.
Peterson, H. C., Lake Lillian.
Peterson, F. A., Scandia.
Peterson, Julius, Roscoe.
Phoenix, Daniel S., Minneapolis.
Pomroy, Charles, Lake Benton.
Prehn, William J., Maine Prairie.
Preston, George J., Rochester.
Rasmussen, Peter, Hanson, S. D.
Rolig, Charles P., Shafer.
Schendel, G. H., Blue Earth.
Scott, Theodore V., East Union.
Seibel, Harry C., Elizabeth.
Sondergaard, H. T., Litchfield.
Streed, E. W., Minneapolis.
Sweet, Lucian A., Fairmont.
Sylte, Charles J., Milan.
Thierman, H. C., Eklund.
Thomsen, Jacob, Sleepy Eye.
Vetleson, Alexander, Fergus Falls.
Wahlstrom, Oscar A., Minneapolis.
Wahlstrom, Erick, Rush Point.
Wandian, E. P. J., Holdingford.
Wellnitz, Ernest, Minneapolis.
Wendt, C. F., North Star.